Developing Supply and Utilization Tables For the U.S. Rice Market

Andy Aaronson and Nathan Childs[1]

Abstract: Each month, USDA releases supply and utilization tables for the U.S. rice market. The tables are used by both the private sector in making market decisions and by government agencies in estimating expenditures. The tables are developed by an interagency committee that is referred to as the rice Interagency Commodity Estimates Committee (ICEC). The ICEC uses all available data and information to develop both *start-of-year* forecasts and final or *end-of-year* estimates. This article explains the procedures and methods utilized to develop monthly forecasts and gives sources of data used in forecasting and end-of-year estimates.

Keywords: Rice, supply, use, exports, imports, stocks, prices, milling rates.

Each month the U.S. Department of Agriculture (USDA) provides supply and utilization tables for the domestic rice market. The tables are a product of an interagency committee that utilizes both reported data from various sources as well as provides short-term forecasts. The committee is named the Interagency Commodity Estimates Committee, or ICEC.

This article explains the methods and procedures used by the ICEC to develop monthly supply and use tables for the U.S. rice market. In addition, the article describes the data sources utilized by the rice ICEC in developing monthly supply and use tables for the U.S. rice market, including dates of release. The article focuses on explaining how both *start-of-year* forecasts and *final-year* estimates are developed. In addition, the rice ICEC revises historic or *back-year* supply and use tables when new information or data become available.

Interagency Committee Develops Supply and Use Tables

The primary agencies involved in the interagency estimating process are the National Agricultural Statistics Service (NASS), the Foreign Agricultural Service (FAS), the Farm Services Agency (FSA), and the Economic Research Service (ERS). The World Agricultural Outlook Board (WAOB) chairs the ICEC and works with these agencies to develop objective, reliable, and timely estimates and forecasts.

NASS provides estimates of U.S. crop production, stocks, and monthly farm prices. FAS is the Department's prime source for commodity information and market developments in foreign countries. FSA provides a great deal of the information related to farm programs and their influence on U.S. production. ERS is the analytical agency of the Department of Agriculture and provides basic economic analysis of world and U.S. supply and demand conditions, including country and regional analysis.

The WAOB releases the short-term supply and use estimates for grains, oilseeds, cotton, sugar, dairy, livestock, and poultry each month in the *World Agricultural Supply and Demand Estimates* report (WASDE). The *WASDE* report is typically released between the 9th and 12th of the month. The Board reviews and clears all publications of the Department's related to market outlook. ERS produces monthly outlook reports that provide in-depth analysis of the information reported in the WASDE. The ERS reports are released electronically the first and second business days after the release of the WASDE.

Methods and Procedures

Each month the rice ICEC develops estimates or forecasts for seven categories (or elements) of supply and use: Beginning stocks; imports; production; domestic food, industrial, and residual; seed use; exports; and ending stocks. In addition, the U.S. season-average farm price is projected.

The tables are balanced, that is total supply—the sum of beginning stocks, imports, and production—equals total utilization—the sum of total domestic disappearance, exports,

[1] Andy Aaronson is the Chair for the rice Interagency Commodity Estimates Committee. Nathan Childs is an agricultural economist with USDA's Economic Research Service. Both authors are located in Washington, D.C.

and ending stocks. The supply and use tables are reported on a rough basis for an August-July market year.

Except for planting intentions, no actual supply and use data are available in May when the first projections for the new market year are released. Instead, the ICEC relies on various forecasting techniques to develop *start-of-year* supply and use tables. As the market year progresses, actual data are used in developing estimates and to eventually replace forecasts. When data for the full market year have been reported, the supply and use table become an *end-of-year* table. There is significant difference between developing *start-of-year* projections and *final-year* estimates.

Start-of-Year Supply & Use Tables Rely on Forecasts

The first USDA supply and use forecast for the next market year is released in May, less than 4 months prior to the start of the new market year on August 1. At the time of the release there is no actual data for the upcoming market year. At this time the majority of the elements in the supply and use table are forecasts by the ICEC. All available information pertaining to the various supply and use elements are used by the ICEC in constructing the forecasts. The following is a description of how the various supply and use elements are projected by the ICEC at the start of the forecast year in May.

Production is forecast using area data from NASS' March *Prospective Plantings* report combined with an ICEC yield projection. A national yield is developed using various statistical procedures that evaluate trends by State and type of rice. One such approach that was used to establish the national yield for the 2000/01 crop utilized a 5-year Olympic average (drop high and low) yield by State and grain type, weighted by expected plantings. In some years longer term analysis is used to develop an average yield if special circumstances warrant it. For example, in 2000 a 10-year Olympic average was used for forecasting yields for California long, medium, and short grain rice due to several recent years of bad weather in the State that severely reduced yields.

The *Prospective Plantings* report released in March provides the ICEC with an estimate of producers' planting intentions by State and grain type. The recent 5-year average of harvested-to-planted ratio is used to estimate harvested area from the reported planting intentions.

The production forecast developed by the ICEC in May is revised in July based on a survey of planted and harvested area reported in the June *Acreage* report. In addition, the forecasted yield is revised based on new weightings due to changes in area by State and grain type. In August, the first production forecast is reported by NASS, which includes the first survey-based yield forecast and a revised area forecast. In September, October, and November, NASS provides revised yield forecasts that are adopted by the ICEC. Typically, area is not revised in September, October, and November. In January, year-end area, yield, and production estimates are reported by NASS.

Imports are forecast by the ICEC using short-term and long-term trend analysis. Typically, the ICEC places more weight on the short-term than long-term trend analysis in developing the import forecast. The ICEC uses historical import data supplied by the Bureau of the Census to develop import forecasts. Throughout the year the rice ICEC re-evaluates the annual forecast as monthly import data become available.

Beginning stocks are carried over from the previous marketing year. In September, the ICEC incorporates the August 1 rice stocks estimate reported in the August *Rice Stocks*. NASS-reported milled rice stocks are converted to a rough basis by the rice ICEC and added to the NASS-reported rough rice stocks to yield total stocks. Prior to September, beginning stocks is an ICEC forecast that is calculated by subtracting a year earlier's total use from total supply.

The *domestic and residual use* is forecast using methods similar to forecasting imports. Two elements make up the domestic use and residual category: *food, industrial, and residual and seed use*. The ICEC uses short- and long-term trend analysis in developing forecasts for the food, industrial, and residual element. In constructing a forecast for food, industrial, and residual, expectations regarding food use, brewers' use, and the residual are considered, although the ICEC does not report these elements separately. The ICEC uses data from the USA Rice Federation's annual milled rice distribution survey, as well as analysis of per capita consumption data to develop forecasts for food use. Historic data from the Bureau of Alcohol, Tobacco, and Firearms on rice use in beer are used to develop projections for brewers' use. Recent 5-year averages are utilized to forecast the residual. *Seed use* is forecast by multiplying a per-acre seeding rate obtained from NASS, times the number of acres expected to be planted next season.

Exports are forecast based on a number of factors, including expectations regarding U.S. competitiveness in the international market, available funding for the U.S. export assistance programs (primarily PL 480 and GSM credit), global import demand, and available supplies among major competitors. U.S. competitiveness is evaluated based on the expected difference between U.S. prices and trading prices of major competitors, primarily Thailand. Prior to making the export forecast, the ICEC reviews and evaluates the export sales activity reported in the FAS weekly *U.S. Export Sales* report, any pertinent information from Attache reports, foreign travel, and other commodity analysts.

To assist in developing accurate forecasts, the ICEC examines the U.S. export market type of rice—long, medium, and short as well as for rough, brown, and milled. The expected

global supply and demand situation for each market is considered. The rice ICEC continually revises the export forecast throughout the year based on shipment data reported by the Bureau of the Census. *Ending stocks* are computed by subtracting the forecast for total use from the forecast for total supply.

The *season-average market price* is forecast based on analysis of expected global prices, available U.S. supplies, and expected ending stocks. In May, the rice ICEC forecasts a season-average price range. The price range is typically $1 to $2 per hundredweight (cwt), depending on the variability expected in the domestic and global markets.

The ICEC employs several forecasting models developed by ERS to project the season-average farm price. Most of these models use the U.S. ending stocks-to-use ratio and various international prices—such as the announced world price or Thai 5 percent—to project a season-average U.S. price. The ICEC uses the price model results plus more subjective techniques to arrive at the forecast price range.

The ICEC refines its forecast range each month using monthly prices reported by NASS in *Agricultural Prices*. The forecast range is narrowed during the year as more monthly price data are available from NASS. In January, NASS reports the season-average farm price in *Agricultural Prices*.

End-of-Year Estimates Use Data from Several Sources

With the exception of the food, industrial, and residual element, all elements of the *end-of-year* supply and use table are based on actual reported data. NASS provides final estimates of acreage, yield, and production as well as stocks and the season-average farm price. The Bureau of the Census provides final estimates for total market year imports and exports. The USA Rice Federation provides final estimates on the amount of rough rice milled and milled rice produced. The average milling rate is calculated from this data.

While seed use is not actually reported by NASS or any other agency, estimates of average seeding rates by State have been developed by the ICEC. Thus, multiplying the seeding rate times next year's expected plantings, yields an estimate of total seed use. This estimate is adjusted as information in next year's plantings are reported. Seeding rate estimates are re-evaluated annually based on any changes resulting from changes in farming practices.

For *end-of-year* tables to balance, the *food, industrial, and residual* category becomes the equation "balancer" and is computed by subtracting the sum of exports, seed use, and ending stocks from total supply. By definition, total supplies must equal total use plus ending stocks. Errors in estimates of beginning stocks, production, imports, seed use, exports, and ending stocks will be reflected in the food, industrial, and residual category. The average milling rate is used to convert supply and use elements that are reported on a brown or milled basis to a rough basis. An error in the average milling rate will be reflected in the food, industrial, and residual category as well.

Information Sources

In developing supply and utilization tables, the ICEC uses a variety of data sources. The sources of the data vary according to the time of year the forecast is made. The following is a description of the sources of data for developing supply and use tables for rice.

NASS Provides Estimates for Area, Yield, and Production…

In March, NASS develops an estimate of intended rice plantings by State and grain type based on a survey of producers completed during the first 2 weeks of March. The expected plantings are developed using a statistically representative sample stratified by type (or class)—i.e., long, medium, and short grain. NASS releases these intended plantings estimates in its March 31 *Prospective Plantings* report. The bulk of U.S. rice plantings occur during April and May.

In June, an estimate of actual planted and harvested acreage by State and grain type is reported by NASS in the *Acreage* report that is released the last working day in June. This is the first survey-based estimate of actual rice plantings for the new market year. NASS develops State-level area estimates using a representative area frame sample technique combined with a list frame that identifies producers by farm size. Other sources of data are used by NASS to check the validity of the area estimates, including FSA data on program enrollment.

The first survey-based yield forecast for the new crops are released by NASS in the August *Crop Production* report. Yields are reported by State but not by grain type. Yield forecasts are developed by asking a representative sample of producers at the first of the month what they expect their yields will be. The information is typically gathered by mail. NASS also revises planted and harvested area by State in August, producing revised production forecasts by State. NASS also provides revised forecasts for total production by grain type. However, area and yield forecasts by grain type are not reported in August.

In September, October, and November, NASS revises its yield and production forecasts for the United States and by State and provides new forecasts for U.S. production by class. This information is reported in the *Crop Production* report released during each of these months. Typically, NASS does not revise its area estimates during these 3 months.

However, only on rare occasions has NASS resurveyed past-year plantings and released new area estimates and provided

revised estimates for the past 2 years. This occurred in September 2000 when NASS decided to re-evaluate production and stocks in the September *Crop Production* report because the August 1 *Rice Stocks* report indicated a much larger residual component in the 1998/99 and 1999/2000 supply and use tables than expected. NASS actually only revised area, yield, and production for 1998 and 1999. Stocks were not revised. The 2000 area, yield, and production were revised as is typically done in September.

Area and yield estimates by State and grain type are reported by NASS in the January *Crop Production* report. In addition, the January report provides revised area and yield estimates for the two previous years. For example, in January 2000, NASS provided revised area, yield, and production data for the 1997, 1998, and 1999 crops. Typically, production for back-years is not revised again until the next January.

…As Well As Data on Stocks, Prices, and Marketings

Rough and milled rice stocks on and off farms are reported by NASS in March, August, October, and December in *Rice Stocks*. The October *Rice Stocks* report data for California only. All stocks are estimated as of the first of the reporting month.

Estimates of off-farm rice stocks are developed from a complete enumeration of facilities that store rice. On-farm stocks are estimated using a sample of farmers known to produce rice.

Each month, NASS reports the monthly average price received by farmers and monthly marketings in the *Agricultural Prices* report. Revised monthly prices and marketings, as well as preliminary State prices, are reported in the July *Agricultural Prices, Annual Summary*. The season-average price for the United States and for each rice-producing State are reported in the January *Agricultural Prices*.

NASS estimates the monthly average price using a complete census of marketings that occurred during the reporting month. Prices are weighted by marketings to yield monthly average cash prices. Monthly prices are not reported by State or type of rice. Transactional prices and marketing volumes are obtained by State from both independent mills and cooperatives. Thus, NASS prices include contracted sales and pooled sales by co-ops. Initial payments by co-ops are typically only partial payments. Thus, the NASS monthly prices may not reflect final cash payment to producers.

Monthly Trade Data Are Reported by the Bureau of the Census

Monthly import and export data are reported by the Bureau of the Census. Data are reported by destination (or origin for imports) and by class and type. Thus, import and export data are reported by length of grain (long, medium, and short) and by type of rice (rough, brown, parboiled, milled, and brokens).

There is a 2-month lag in the reporting of U.S. trade data. For example, August U.S. rice import and export data are reported in mid-October shortly after the October WASDE is released. Thus, total U.S. rice exports and imports for the

Conversion Factors for Milled and Brown Rice

USDA's monthly supply and use tables are reported on a rough basis. Thus, some supply and use data, such as milled rice exports and milled rice stocks, must be converted to a rough basis for inclusion in monthly tables.

The rice ICEC uses a variety of milling rates to convert milled and brown rice data to a rough basis. U.S. data reported on a milled basis are converted to a rough basis by dividing by the estimated milling rate for the appropriate year. For example, 1999/2000 U.S. milled rice exports are converted to a rough basis by dividing by .691, the estimated milling rate for 1999/2000. Similarly, U.S. milled rice stocks are converted to a rough basis by dividing by the appropriate year's milling rate. For example, 1999/2000 milled rice ending stocks are converted to a rough basis by dividing by the estimated milling rate for 1999/2000.

For brown rice, the rice ICEC assumes a conversion factor of .80 each year. Thus, U.S. brown rice exports are converted to a rough basis by dividing by .80. To convert milled rice to a brown basis, the ICEC assumes a conversion factor of .88. Thus, divide data reported on a milled basis by .88 to convert it to a brown basis.

For U.S. rice imports, the rice ICEC assumes a conversion factor of .70 each year to convert milled imports to a rough rice basis and .80 each year to report brown rice imports on a rough basis.

The ICEC uses actual U.S. millings provided by the USA Rice Federation to develop estimated annual milling rates for the United States. Basically, total milled rice produced during the market year—including both head rice and brokens—is divided by total rough rice milled. Until actual milling data are available, the average milling rate of the past 5 years is used. Milling rates vary by year depending on weather, varieties grown, and shifts in production between regions.

past August-July market year are reported in the November WASDE. The import and export data reported by the Bureau of the Census are considered the final data.

The monthly trade data reported by Census are on a product-weight basis (actual shipping weight) and are converted to a rough rice basis by the ICEC. U.S. milled rice exports are converted to a rough basis by using the estimated milling rate for that year. For U.S. rice imports, the ICEC uses a conversion factor of .70 each year. For both U.S. exports and imports, a conversion factor of .80 is used each year to report brown rice shipments on a rough basis.

FSA and FAS Provide Critical Data and Information

Throughout the year both FAS and FSA provide useful data and analysis to the ICEC. FAS maintains data on food aid shipments and allocations, export credit sales, weekly export sales, and information on events in foreign countries that could impact the U.S. rice market. Weekly exports and sales data are reported by FAS in *U.S. Export Sales*. The *U.S. Export Sales* report does not include food aid donations that are included in Census trade data. The rice ICEC monitors data from the *U.S. Export Sales* report in its monthly analysis.

In addition to data on U.S. export sales, each month FAS releases full supply and utilization tables for nearly every country in the world plus a global total. These estimates and forecast are developed jointly with the WAOB and ERS during monthly meetings in preparation for the release of the WASDE. The global supply and use table is included in the WASDE. Select country and regional supply and use data are released 2 days after the WASDE in *Grains: World Markets and Trade*. The full production, supply, and utilization tables by country are available about a week later on the Internet at *http://www.ers.usda.gov/data/psd.*

FSA provides information to the ICEC on any policy change that may impact the U.S. rice market. Updated information on loan activity, disaster assistance, and production flexibility contract payments are all provided by FSA. In addition, FSA, FAS, and the WAOB jointly calculate the announced world market price by grain type that is released every Tuesday afternoon. The announced world price is used to determine marketing loan benefits.

Information Sources for U.S. Rice Supply and Use Tables

Area:

Planting intentions—Reported by NASS in the March 31 *Prospective Plantings*. Reports planting intentions by State and grain type.

First survey of actual plantings—Reported by NASS in the June 30 *Acreage* report.

First estimates—Reported by NASS in the January *Crop Production, Annual Summary*. Reports area, yield, and production estimates by State by grain type.

Yield:

First objective yield forecast—Reported by NASS in the August 30 *Crop Production*. Reports average yield by State and for total U.S. rice.

Revisions—Reported by NASS in the September, October, and November issues of *Crop Production*. Reports yield and crop revisions by State and total rice.

First estimates— Reported by NASS in the January *Crop Production, Annual Summary.* Reports area, yield, and production estimates by State by grain type.

Production:

First survey-based forecast—Reported by NASS in the August *Crop Production*.

Revisions—Reported by NASS in the September, October, and November issues of *Crop Production*. Reports yield and crop revisions by State and total rice.

First estimates—Reported by NASS in the January *Crop Production, Annual Summary*. Reports area, yield, and production estimates by State by grain type.

Stocks:

August 1—Reported by NASS in the August *Rice Stocks* by State and by grain type.

October 1—Reported by NASS in October *Rice Stocks* by State and grain type for California only.

December 1—Reported by NASS in January *Rice Stocks* by State and by grain type.

March 1—Reported by NASS in March *Rice Stocks* by State and by grain type.

Please note that NASS area, yield, and production data can be accessed on the Internet at *http://www.usda.gov/nass/pubs/rptscal.htm*

Imports:

Monthly imports—Quantity and value reported by the Bureau of the Census, Department of Commerce on product-weight basis. Can access from Foreign Agricultural Trade of the United States (FATUS) at the ERS Web Page (*www.ers.usda.gov*). Reported data are lagged two months. Can access monthly U.S. imports by type of rice and source.

Exports:

Monthly shipments—Quantity and value reported by the Bureau of the Census, Department of Commerce on product-weight basis. Can access from Foreign Agricultural Trade of the United States (FATUS) at the ERS Web Page (*www.ers.usda.gov*). Can access monthly U.S. imports by type of rice and source.

Weekly commercial sales and exports—Reported by FAS in *U.S. Export Sales* released on Thursday mornings. Reports combined brown/rough category and milled for both long grain and combined medium/short. Separate reporting of rough rice sales and shipments included in the *Highlights* section. All data are on product-weight basis. Food donations are not included. The *U.S. Export Sales* report can be accessed weekly at *http://www.fas.usda.gov/export-sales/esrd1.html*.

Farm Prices:

Monthly cash prices—Reported by NASS the last day of every month in *Agricultural Prices*. Prices are national averages of all types of rice weighted by marketings.

Annual State prices—First projection for 1998/99 annual State prices were reported in the July 1999 *Agricultural Prices Annual* report by NASS. Final estimate for 1998/99 State prices were reported by NASS in the January 2000 *Agricultural Prices*.

Annual prices by type —Final annual prices by grain type (long and combined medium/short) reported by NASS in January *Agricultural Prices.* In January 2000, NASS reported final prices by grain type for 1997/98 and 1998/99.

Marketings:

Monthly marketings—Total monthly marketings reported by NASS in *Agricultural Prices*. Note reported marketings are lagged one month.

Final monthly marketings—Revised monthly marketings for current and previous 2 years reported by NASS in the July *Agricultural Prices Annual*.

Crop Values:

Reported by NASS in the February *Crop Values*. In February 1999, reported preliminary crop values by State and total for 1998/99 and any revisions for 1996/97 and 1997/98.

Please note that NASS price, marketing, and value data can all be accessed from the Internet at *http://www.usda.gov/nass/pubs/rptscal.htm*.